

What is claimed is:
Claims

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1. A method for defining the relationship between frequency and amplitude of a pulse function for acting on a data stream for transmission in a telecommunications system to compensate for distortion by a component of the transmitter, the method comprising:

defining desired cost parameters on the basis of the telecommunications system requirements and the distortion to be compensated for; and

- 10 defining the amplitude of the pulse function over a range of frequencies in dependence on the desired cost parameters.

2. A method as claimed in claim 1, wherein the compensation is for non-linear distortion.

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3. A method as claimed in claim 2, wherein defining the distortion to be compensated for comprises defining first and second distortions.

4. A method as claimed in claim 3, wherein the first and second distortions relate to different component tolerances.

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- ~~5. A method as claimed in claim 3 or 4, wherein the method comprises weighting the first and second distortions.~~

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- ~~6. A method as claimed in any preceding claim, wherein the compensation is for distortion by a linear component of the transmitter.~~

7. A method as claimed in claim 6, wherein the compensation is for distortion by a reconstruction filter.

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is for distortion by a non-linear component of the transmitter.

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the method of any preceding claim for defining the amplitude of the pulse function over a range of frequencies in dependence on the desired cost parameters for the first component;

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defining the amplitude of the pulse function over a range of frequencies in dependence upon the cost parameters of the second component and the pulse function defined for the first component.

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14. A method as claimed in any preceding claim, wherein desired cost parameters are defined on the basis of TDMA telecommunications system requirements.

15. A method as claimed in any preceding claim, wherein desired cost parameters are defined on the basis of GSM requirements.

16. A method as claimed in claim 14 or 15, wherein the pulse function is defined such that a pulse of Gaussian shape may be transmitted.

17. A method as claimed in any of claims 1 to 13, wherein desired cost parameters are defined on the basis of CDMA requirements.

18. A method as claimed in claim 17, wherein the pulse function is defined such that a pulse of root raised cosine shape may be transmitted.

19. A method according to any preceding claim, wherein the amplitude of the pulse function over a range of frequencies is defined in an iterative process in which the pulse function is altered and the cost parameters determined until an acceptable balance of cost parameters is achieved.

20. A method according to any preceding claim, wherein the method comprises the step of weighting the respective cost parameters.

21. A method according to claim 20, wherein an acceptable balance between the cost parameters is achieved by optimizing the respective costs with the respective weightings.

22. A method according to claim 21, wherein the optimization is performed using an optimizer computer programme.

Sub Part 5 ~~23. A pulse function generator for converting a data stream in accordance with a pulse function shaped in accordance with the relationship defined by the method of any preceding claim.~~

24. A modulator for providing a signal for transmission in a telecommunication system comprising:

10 means for shaping a data stream in accordance with the pulse function generator of claim 23.

25. A modulator according to claim 24, wherein the means for shaping comprises a look-up table.

Sub Part 15 ~~26. A transceiver for a communication device comprising a modulator in accordance with claim 24 or 25 and a demodulator.~~

27. A communication device operable in communication system comprising
20 a transceiver according to claim 26.

Sub Part 25 ~~28. A dual mode communication device operable in a first mode in a TDMA telecommunications system in which a channel is a combination of frequency and timeslot and a second mode in a CDMA telecommunications system, comprising a modulator for modulating a data stream with a carrier signal in accordance with a predetermined modulation scheme in both the first and second modes of operation and a pulse function generator for shaping a data stream in accordance with respective pulse functions responsive to the mode of operation of the radio telephone and distortion by a component of the~~
30 transmitter.

~~29. A dual mode communication device operable in a first mode when a first set of cost parameters are desired and in a second mode when a second set of cost parameters are desired, the radiotelephone comprising:~~

5 ~~a first pulse function generator for converting a data stream in accordance with a pulse function shaped in dependence on the first set of desired cost parameters;~~

10 ~~a second pulse function generator for converting a data stream in accordance with a pulse function shaped in dependence on the second set of desired cost parameters; and~~

~~means for selecting the pulse function generator in accordance with the mode of operation of the phone;~~

15 ~~wherein at least one of the pulse functions is shaped in accordance with the relationship defined by the method of any of claims 1 to 22.~~

30. A communication device as claimed in claim 29, which is operable at a first data rate in the first mode and a second data rate in the second mode.

20 31. A communication device as claimed in claim 29, wherein the first data rate supports voice applications and the second data rate supports data applications.

25 ~~32. A dual mode communication device operable in a first mode when a first set of cost parameters are desired and in a second mode when a second set of cost parameters are desired, the radiotelephone comprising:~~

~~a modulator for modulating a data stream with a carrier signal in accordance with a predetermined modulation scheme in both the first and second modes of operation;~~

a first pulse function generator for shaping a data stream in accordance with a pulse function shaped in dependence on the first set of desired cost parameters and distortion by a component of the transmitter;

- 5 a second pulse function generator for shaping a data stream in accordance with a pulse function shaped in dependence on the second set of desired cost parameters and distortion by a component of the transmitter; and

means for selecting the pulse function generator in accordance with the mode of operation of the phone.

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~~33. A method for selecting a modulation scheme for a communication system using a predetermined transmitter, the method comprising:~~

~~defining a pulse function for a first modulation scheme in accordance with the method as claimed in any of claims 1 to 22;~~

~~15 defining a pulse function for a second modulation scheme for the same desired cost parameters;~~

~~determining the resultant cost parameters for each scheme; and~~

~~selecting the modulation scheme which gives good resultant cost parameters given the desired ones.~~

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~~34. A method for defining the relationship between frequency and amplitude of a pulse function for acting on a data stream for transmission in a telecommunications system to compensate for distortion by a component of the transmitter, the method substantially as hereinbefore described with~~
 25 reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

~~35. A method for selecting a modulation scheme substantially as~~
 30 hereinbefore described with reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

~~36.~~ A pulse function generator substantially as hereinbefore described with reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

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~~37.~~ A modulator for providing a signal for transmission in a communication system substantially as hereinbefore described with reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

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~~38.~~ A transmitter and/or receiver for a radiotelephone substantially as hereinbefore described with reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

15 ~~39.~~ A radiotelephone substantially as hereinbefore described with reference to, and/or as illustrated in any one, or any combination of the figures of the accompanying drawings.

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